July 15, 1958 R. D. PARMLEY 2,843,313

MEANS FOR COOLING HIGH VACUUM ROTARY PUMPS

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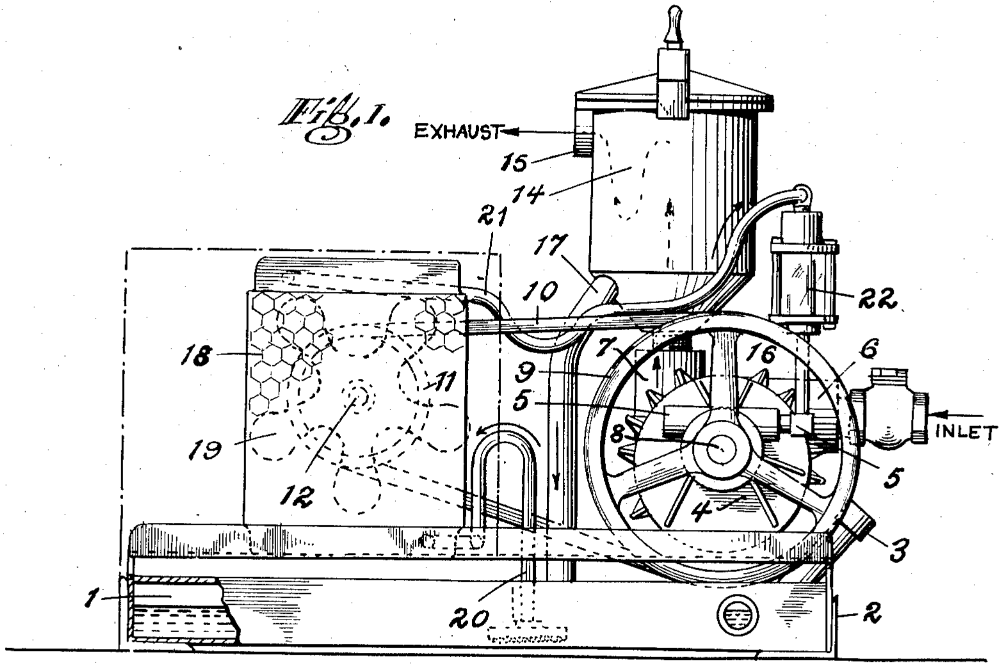
Fig. 1.



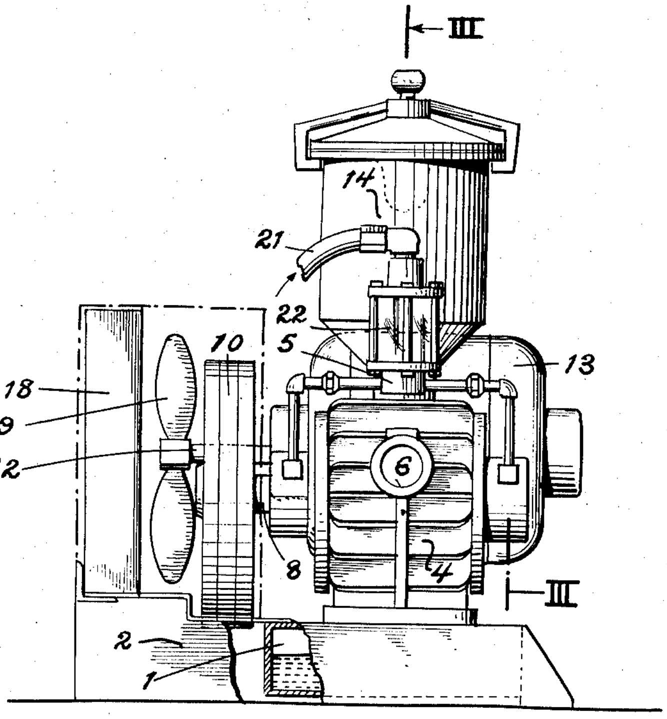


Fig. 2.

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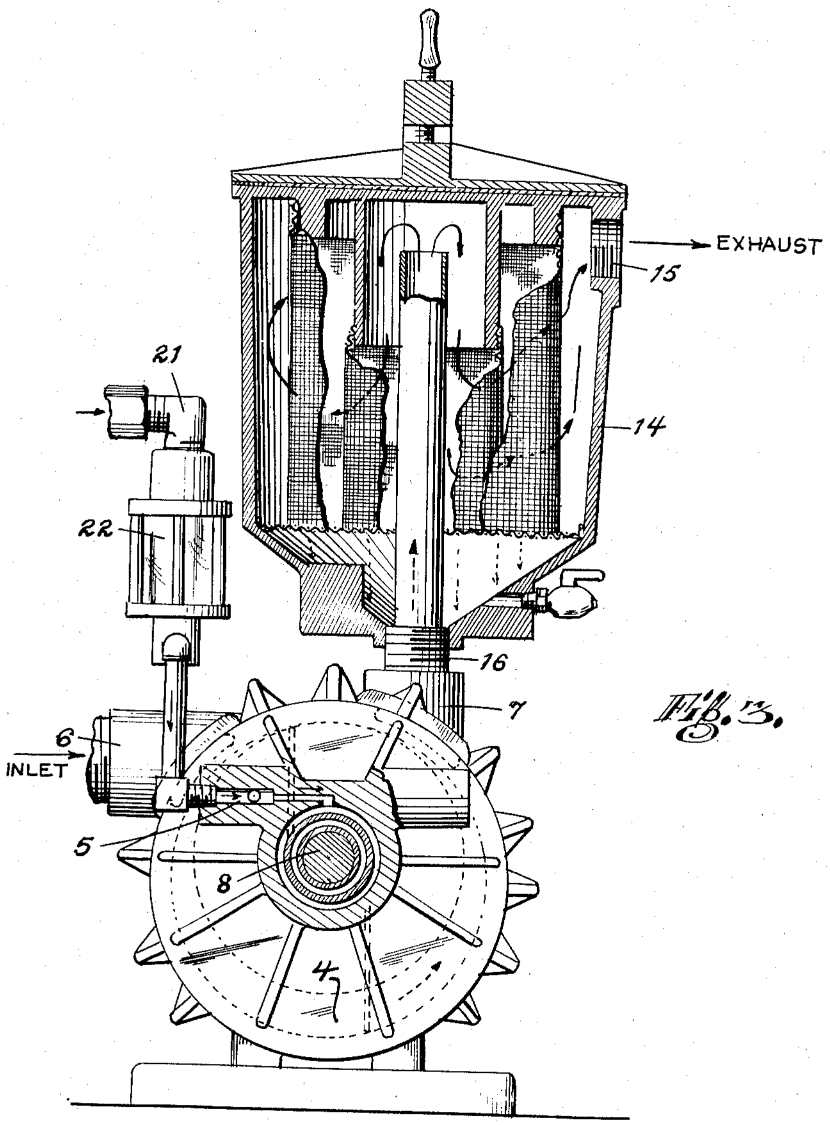

Fig. 3.

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# MEANS FOR COOLING HIGH VACUUM ROTARY PUMPS

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Application April 18, 1956, Serial No. 579,088

2 Claims. (Cl. 230—207)

My invention is directed to novel means for cooling high vacuum rotary pumps.

The object of my invention is to cool the hot lubricating oil after it has left the oil separator of the vacuum pump and has been returned to the oil reservoir and is being drawn again into the pump; thereby insuring a sufficient lubrication of the pump to prevent it from overheating.

A practical means for carrying out my invention is represented in the accompanying drawings.

Fig. 1 represents the high vacuum rotary pump in side elevation.

Fig. 2 represents a rear elevation of the same.

Fig. 3 represents an enlarged partial section taken in the plane of the line III—III of Fig. 2.

The lubricating oil reservoir is denoted by **1** and it is housed in a suitable base **2**. This reservoir may be provided with a filler pipe **3** to keep the oil at the desired level.

The high vacuum rotary pump **4** is shown as provided with a cooled oil inlet **5**, an air inlet **6** and an oil impregnated air discharge outlet **7**. The shaft **8** of this pump **4** is provided with a pulley **9**, operatively connected by a belt **10** to a pulley **11** on the shaft **12** of the rotary electric motor **13**. Both the motor and the pump are shown as mounted on the oil reservoir base **2**.

The usual oil separator **14** which surmounts the pump **4** has an air exhaust port **15** and an inlet **16** which is connected to the pump discharge outlet **7**. The separated oil passes downwards through the drip pipe **17** which leads downwards from the separator **14** into the oil reservoir **1** above the oil level therein.

The unit for cooling the oil as it is drawn from the reservoir **1** to the pump **4** comprises the following elements; a radiator **18** (which is mounted on the oil reservoir base **2**), and its cooling fan **19** which is fixed to the motor shaft **12**.

The vacuum pump **4** draws the hot oil through the pipe **20**, which leads from the reservoir **1** below its oil level to the bottom of the radiator **18** to supply the oil thereto. Another pipe **21** leads from the top of the radiator **18**, to the interior of the vacuum pump **4** (preferably through a sight feed **22**) to supply the cooled oil to the pump.

It will be seen that the hot lubricating oil which has been separated from the air by the separator **14** is returned by gravity flow to the reservoir above the oil level therein. The hot oil is then drawn by the suction of the vacuum pump, through the cooling unit back to the pump. This flow of cooled oil is sufficient to keep the pump cool enough to prevent damage thereto by overheating. Also by this cooling of the oil, its viscosity is kept at a point where it provides a better lubricating film and thereby a better seal for the vacuum. Also, keeping the pump cool increases its volumetric efficiency and materially lengthens the life of the pump and enables it to pull a higher vacuum.

What I claim is:

1. In combination, a suitable base, a lubricating oil reservoir housed therein and provided with a filler pipe to keep the oil at the desired level, a high vacuum rotary pump mounted on said base and having a cooled oil inlet, an air inlet and an oil impregnated air discharge outlet, an oil separator surmounting the pump and having an air exhaust port, an inlet connected to the air discharge outlet of the pump, and a drip pipe for the separated oil leading to the reservoir above its oil level, and an oil cooling unit also mounted on said base provided with a pipe leading to the reservoir below its oil level and another pipe leading to the cooled oil inlet of the pump, said pump being operable to draw the oil from the reservoir through the oil cooling unit to said pump.

2. In combination, a suitable base, a lubricating oil reservoir housed therein and provided with a filler pipe to keep the oil at the desired level, a high vacuum rotary pump mounted on said base and having a cooled oil inlet, an air inlet and an oil impregnated air discharge outlet, an oil separator surmounting the pump and having an air exhaust, an inlet connected to the air discharge outlet of the pump, and a drip pipe for the separated oil leading to the reservoir above its oil level, an oil cooling unit also mounted on said base and including a radiator and its cooling fan, said radiator being provided with a pipe leading to the reservoir below its oil level and another pipe leading to the cooled oil inlet to the pump, and a rotary electric motor having a belt and pulley driving connection with the fan and the said pump, to cause the pump to draw the oil from the reservoir through the radiator into the pump.

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